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LabLink

Director, Bureau of Laboratories
Sandip Shah, PhD, HCLD(ABB)

this issue...

Bureau Vision
The Bureau of Laboratories is a stronger, more diverse team within an integrated public health system. We utilize advanced technology and innovative leadership to provide comprehensive public health services in our dynamic global community.

Bureau Mission
We are dedicated to continuing leadership in providing quality laboratory science for healthier people and communities through partnerships, communication, and technical innovation.

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MDHHS
Michigan Department of Health & Human Services
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Blastomycosis in the Great Lakes Region

Author: Tonya Heyer

Blastomyces dermatitidis is a fungus that is endemic in parts of the United States and Canada that surround the Ohio and Mississippi River valleys, the Great Lakes, and the Saint Lawrence River. The fungus can be found living in decomposing organic matter such as wood and leaves as well as in moist soil. *Blastomyces dermatitidis* is a dimorphic (both a mold and a yeast phase) fungus. In the environment, *Blastomyces dermatitidis* lives as a mold and produces fungal spores. Once the fungal spores are inhaled and enter the lungs of a human, the temperature in the body allow the spores to transform into a yeast. The yeast can remain in the lungs or spread to other areas of the body.

Symptoms

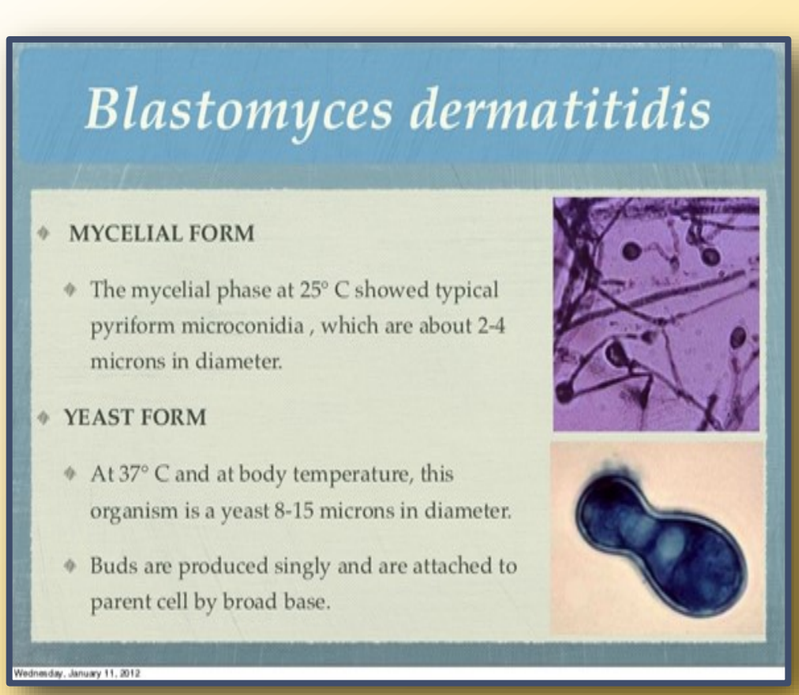
Humans become infected with *Blastomyces dermatitidis* after inhaling the fungal spores that are disrupted from the soil. Only about half of those who inhale the spores will show symptoms. Symptoms of Blastomycosis are similar to that of the flu, and include fever, cough, night sweats, muscle aches, weight loss, chest pain, and fatigue. Severe Blastomycosis can occur in people with weakened immune systems and can spread from the lungs to other body parts, including the skin, bones, joints, and the central nervous system. Symptoms usually occur within 3 weeks to 3 months after inhalation of the spores.

Testing

The Michigan Department of Health and Human Services (MDHHS) identifies *Blastomyces dermatitidis* both by culture identification and the Fungal Complement Fixation test. The fungal culture is done in the Mycobacteriology/Mycology unit, while the Fungal Complement Fixation test is performed in the Viral Serology unit.

The fungal culture detects the presence of both the mold and yeast phases of growth. When the culture is incubated at 30°C, a white downy growth is observed macroscopically. The microscopic exam of the mold phase will show hyaline septate hyphae with solitary, unicellular conidia that is pyriform in shape. When the culture is incubated at 37°C on a rich media such as Kelly's agar, a white, creamy growth is observed macroscopically. The microscopic exam of the yeast phase will show large refractile yeast with broad base budding. When the yeast phase is observed, the identification of *Blastomyces dermatitidis* is confirmed with the Hologic Accuprobe® Blastomyces DNA probe kit.

The Fungal Complement Fixation test is used to detect the presence of a specific antibody for Histoplasma, Blastomyces, and Coccidioides in a patient's serum based on the ability of antibody, which is combined with its homologous antigen, in the presence of complement, to "fix" or take up the complement in proportion to the strength of the antibody-antigen reaction.



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Blastomycosis in the Great Lakes Region

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The strength of this reaction is measured indirectly by assaying for excess complement. Immunodiffusion is a supplemental assay performed when complement fixation results are positive or by special request.

Treatment

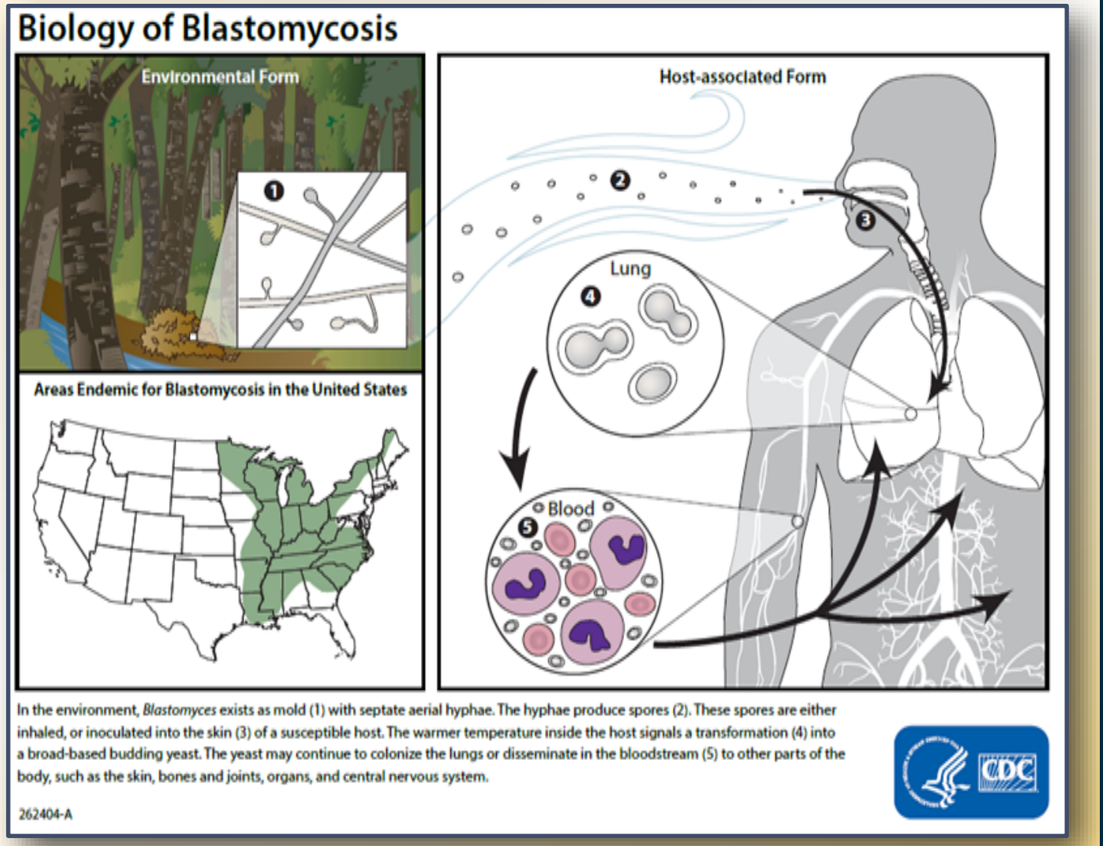
Itraconazole is the treatment of choice for mild to moderate Blastomycosis. In cases of severe disease, such as lung involvement or infections that have spread to other parts of the body, Amphotericin B is usually recommended. The course of treatment can range from six months to one year depending on the immune status of the infected person.

Risk and Prevention

Anyone living in endemic areas for *Blastomyces dermatitidis* can develop Blastomycosis. Individuals who participate in outdoor activities (such as hunting, camping and forestry work) in wooded areas are at a higher risk of exposure. Pets, especially dogs, can develop Blastomycosis with symptoms similar to humans. Blastomycosis cannot be spread from person to person or from people to animals. There is no way to completely avoid exposure to *Blastomyces dermatitidis* and there currently is no vaccine available. A person with a weakened immune system may want to avoid activities that disrupt the soil in the endemic areas.

Statistics

Even though Michigan is in the endemic area for Blastomycosis, the overall risk of Infection is low. In States where Blastomycosis is reportable, the yearly incidence rates are about 1-2 cases per 100,000 population. Wisconsin has the highest incidence, with an average of 10-40 cases per 100,000 per year. (CDC, 2015)



Perfluoroalkylated Substances (PFAS) in Water: Method Development and Validation

Author: Matthew Geiger

For over 30 years, the State of Michigan has collected and analyzed fish from the state's bodies of water. These fish are tested for many contaminants of interest, one of which being Perfluoroalkylated substances, or PFAS. The term "PFAS" is easily recognizable within the State of Michigan these days as an emergent environmental contaminant.

PFAS compounds are suspected as carcinogens, as well as endocrine disruptors, containing halogenated alkyl chains and a hydrophobic group, such as a carboxylic or sulfonic acid. What makes PFAS unique and highly marketable, though, is that they can repel both hydrophobic and hydrophilic compounds, which leads to them being commonly found in both industrial and consumer products. Because of their wide use throughout so many industries, they are now being commonly found as environmental contaminants. Another use of PFAS is in aqueous firefighting foams (AFFF), leading to the frequent discovery of PFAS contamination near military bases. The main concern with these compounds is their structural stability, and therefore their unlikelihood of naturally decomposing. Therefore, these compounds are of serious risk for bioaccumulation, which is why the initial interest was in concentrations of PFAS in fish.

Recently though, the focus of PFAS contamination has shifted to water sources as another direct source of human exposure to PFAS. Measurable levels of two common PFASs, perfluoro-n-octanoate (PFOA) and perfluoro-1-octylsulfonate (PFOS) have been detected in various home water supplies around the State of Michigan. According to the State of Michigan PFAS Response Site (michigan.gov/pfasresponse), there are currently 34 confirmed PFAS contamination sites, including 10 which can be tied to active or former military facilities. Because of the high prevalence of known sites, and the ever-increasing possibility of finding new PFAS sites, it is crucial for the State of Michigan to develop a water testing method for identification of these new sites and their potential risks.

The Analytical Chemistry section (AC section) was tasked with the development of a PFAS water testing method to be able to provide analytical results to the Michigan Department of Environmental Quality (DEQ) and the Michigan Department of Health and Human Services (MDHHS) Division of Environmental Health so that environmental contamination can be measured, and human exposure understood. As there are many types of water matrices (drinking water, surface water, ground water, effluent water) and many samples were expected to be received, it was the goal of the AC section to be able to develop a PFAS water testing method that is capable of quickly analyzing many samples (high-throughput) and that can be used for testing on any type of water matrix. Through discussions, a core list of 24 PFAS analytes were determined to be of interest.

The AC section has heavily embraced technological advancements in water extraction (advanced solid phase extraction (SPE) phases), automation TomTec 96-well plate sample preparation robot), and analytical instruments (Shimadzu 8060 LC-MS/MS) to be able to create an efficient and accurate analytical method, capable of determining the concentration of PFAS in any water sample to a concentration of 2 parts-per-trillion (ppt). What makes this method unique and so robust is its automated SPE extraction of small volume (6 mL) water samples in a high-throughput format, coupled with near-baseline chromatographic separation of 24 Perfluorinated compounds, including the separation of linear/branched isomers, across a range of three-orders of magnitude (2 ppt – 1 ppb).

In addition to fish and water PFAS analysis, the lab is currently developing methods for PFAS analysis in additional matrices, such as venison and serum.

Packaging and Shipping of Clinical Samples,
2018 Fall Course Schedule

This course provides a comprehensive overview of Federal, DOT & USPS, and International IATA regulations applicable to the packaging and shipping of laboratory specimens.

The first two hours of this class is a combined program designed to meet the needs of those seeking recertification as well as individuals who need full certification. The full certification program runs the entire 4 hour scheduled class.

This intermediate level course offers awareness of regulatory terminology, packaging, labeling, and documentation requirements through integration of lecture, demonstrations, group exercises, and handouts.

Successful completion of this course allows the attendee to meet the requirements for employer certification.

If you are interested in attending any of the sessions listed in the adjacent table, please register on the MI-TRAIN website: **https://www.train.org/mi-train**.

The course name is ***Packaging and Shipping of Clinical Samples.***

The course identification number is ***1062236.***

For questions, please contact Shannon Sharp by telephone at (517) 335-9653 or by email at **sharps1@michigan.gov**.

Facility Name	Address	Date	Time
Caro Community Hospital Room: Conference room located in the basement	401 N Hooper St. Caro, MI 48723	10/2/2018	10am-2pm (Recertification 10am-Noon)
MDHHS **Bureau of Laboratories** Room: 282 (2nd Floor)	3350 N. Martin Luther King Jr. Blvd. Lansing Michigan 48906	10/16/2018	1pm-5pm (Recertification 1pm-3pm)
Michigan Medicine Formerly- University of Michigan Health System Building: NCRC 35 Room: 35-1451 Superior	2800 Plymouth Road Ann Arbor, MI 48109-2800	10/24/2018	10am-2pm (Recertification 10am-Noon)
MDHHS **Bureau of Laboratories** Room: 282 (2nd Floor)	3350 N. Martin Luther King Jr. Blvd. Lansing Michigan 48906	11/08/2018	1pm-3pm (Recertification only)

Revised Sentinel Clinical Laboratory Definition

Author: Shannon Sharp

In collaboration with the Laboratory Response Network (LRN), Centers for Disease Control and Prevention (CDC), American Society for Microbiology (ASM), and Association of Public Health Laboratories (APHL), the sentinel clinical laboratory definition and responsibilities were updated and approved in June 2018 by the LRN Joint Leadership Commission.

Some of the major changes to the sentinel laboratory definition and responsibilities include:

- Added responsibility statements for core or main labs to communicate biothreat information and handling procedures within their own satellite laboratories and to help disseminate critical safety and biothreat agent information and share training responsibilities with “non-micro” labs.
- Included enhanced biosafety information and biological risk assessment information.
- Addresses biothreat agents outside of high complexity testing by including statements for moderate complexity, “point of care testing” and “culture independent diagnostic tests”.

The updated definition and responsibilities can be found at the following website:

https://www.aphl.org/aboutAPHL/publications/Documents/Definition-Sentinel-Clinical-Laboratories.pdf

LabLink is published quarterly by the Michigan Department of Health and Human Services, Bureau of Laboratories, to provide laboratory information to Michigan health professionals and the public health community.

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Editor: Teresa Miller